

Foreword

The National Petroleum Council is pleased to report to the Secretary of Energy that, given immediate focus on key issues, natural gas can make an important contribution to the nation's increasing energy needs and its environmental goals through 2015 and beyond. The natural gas industry has evolved into a competitive industry offering its expanding and reliable services on a nationwide basis. Between 1990—the reference point for the 1992 NPC report—and 1998, total U.S. gas consumption grew from 19.3 trillion cubic feet (TCF) to an estimated 22 TCF and continues to represent approximately a quarter of the nation's fuel needs. Using the study methods described in this report, the Council concludes that gas demand is likely to increase to 29 TCF in 2010 and could increase beyond 31 TCF in 2015. Further, the resource base exists to support the indicated levels of future demand and adequate gas supplies can potentially be produced to meet that market. The additional supply required can be brought to market at competitive prices through an expanded network of pipeline, storage, and distribution facilities. However, the Council recognizes that meeting the significant challenges that accompany such vigorous market growth will require strenuous effort by the industry and substantial support on key issues by the government.

The initial impetus for the current study came from a letter dated May 6, 1998, in which then-U.S. Energy Secretary Federico Peña requested the National Petroleum Council to:

Reassess its 1992 report [*Potential for Natural Gas in the United States*] taking into account the past five years' experience and evolving market conditions that will affect the potential for natural gas in the United States to 2020 and beyond. Of particular interest is the Council's advice on areas of Government policy and action that

would enable natural gas to realize its potential contribution toward our shared economic, energy, and environmental goals.

In making his request, the Secretary noted that “at least two major forces ... are beginning to take shape which will profoundly affect energy choices in the future – the restructuring of electricity markets and growing concerns about the potentially adverse consequences that using higher carbon-content fuels may have on global climate change and regional air quality.” Further, the Secretary stated that “For a secure energy future, Government and private sector decision makers need to be confident that industry has the capability to meet potentially significant increases in future natural gas demand.” (See Appendix A for this letter and Secretary Bill Richardson’s follow-up letter expressing his interest in receiving the Council’s advice on these matters.)

To respond to this request, the Council established a 1998 Committee on Natural Gas under the Chairmanship of Peter I. Bijur, Chairman and Chief Executive Officer, Texaco Inc. T. J. Glauthier, Deputy Secretary of Energy, served as the Committee’s Government Cochair, with H. Leighton Steward, Vice Chairman of the Board, Burlington Resources, Inc., and William A. Wise, President and Chief Executive Officer, El Paso Energy Corp., serving as Vice Chairs for Supply and for Transmission & Distribution, respectively. The Committee was assisted by a Coordinating Subcommittee, chaired by Rebecca B. Roberts, Strategic Partner, Global Alignment, Texaco Inc., with Robert S. Kripowicz, Principal Deputy Assistant Secretary, Fossil Energy, U.S. Department of Energy, serving as Government Cochair. (Appendix B contains the Committee roster along with the rosters of its Coordinating Subcommittee and three Task Groups on Demand, Supply, and Transmission and Distribution.)

KEY DIFFERENCES FROM 1992

The Secretary was correct in noting that the U.S. energy markets have changed significantly since the 1992 NPC study. The U.S. economy is growing more rapidly than anticipated in 1992, and with that growth has come a higher

natural gas demand than was expected. Environmental regulations that favor natural gas consumption are more firmly in place than in 1992 and environmental restrictions on fossil fuel-burning facilities are increasingly stringent. In fact, gas demand has grown at a rate that exceeds even the most robust scenario projected in the 1992 study. Continued economic growth as well as concerns about air quality and climate change favor the continued expansion of natural gas demand.

Since 1992, the gas industry has undergone a significant restructuring. The primary impetus came from Federal Energy Regulatory Commission (FERC) regulations, which over time have converted interstate pipelines from sellers and transporters of natural gas to solely transporters. State regulators and local distribution companies (LDCs) are moving toward a similar result in many jurisdictions. This restructuring has driven changes in roles and risks for industry participants because a number of market functions and obligations formerly managed under the auspices of the LDCs and pipelines must now be accepted and carried out by other market participants. Since the 1992 study, new market structures—market hubs/centers, futures trading for natural gas, and a capacity release market (a secondary pipeline capacity market)—have either developed or matured. Other financial tools have been developed to reduce the risk of price change to buyers and sellers over extended time periods. In short, the gas market has become highly efficient and sophisticated, with numerous participants ensuring competitive prices. Increased confidence in the functionality of the gas market and in competitive gas prices has played a significant role in increasing gas demand.

The industry has benefited from remarkable progress in technology in areas that were not fully anticipated in 1992. For example, three-dimensional (3D) imaging now allows scientists to virtually “see” underground rock formations in graphic detail and to reduce drilling risk by more accurately predicting locations for hydrocarbon deposits. Progress in 3D and 4D seismic technology, in conjunction with imaging technology, has allowed producers to spot small hydrocarbon accumulations. Improved drilling techniques enable

production companies to more precisely hit drilling targets and accomplish difficult maneuvers such as drilling a vertical well, turning a corner, and then drilling horizontally over five miles. New technology now allows producers to access supply in ocean waters that are more than a mile deep. These improvements, along with many more, have resulted in significant reserve additions and prospects of new production in areas that were once considered physically or economically unreachable.

Technological progress has also been evident in the transmission and distribution segments of the industry and has contributed to a steady and significant decline in transmission and distribution charges since the mid-1980s. Technological advances have taken place in areas such as gas measurement, pipeline monitoring, compression, and storage management. The dramatic improvements in information and communications technology have contributed to more efficient data management systems that support marketing activities and capacity scheduling. New end-use gas technologies, such as higher efficiency residential furnaces, natural gas cooling, and combined cycle power plants, continue to offer consumers higher efficiency, lower costs, and cleaner energy.

Although market confidence has grown and technology has improved the state of the industry, recent events have led to questions about the industry's ability to meet the demand growth potential. The downturn in world oil prices between late 1997 and early 1999 dealt a heavy blow to the exploration and production sectors of the U.S. gas industry, particularly to the oilfield supply / service contractors and the independent producers who supply over half of the nation's natural gas needs. Industry participants experienced an extended period of poor economic returns and, fearing a repeat of the 1984–89 depression in the industry, responded with significant downsizing and cutbacks in spending. Investment capital for developing new production, which for most industry participants is highly dependent on cash flow from crude oil and gas sales, declined dramatically in 1999. As a result, new supply development in the United States has slowed considerably. Although oil prices have now rebounded, these events have highlighted the boom and bust nature of the business and have made industry participants and investors very cautious.

Several other trends highlight the challenges that could impact the future of gas production and delivery. The broadening and extension of moratoria have reduced access to a portion of the nation's natural gas resource base. The economic hardship experienced by the oilfield supply/service sector has limited construction of rigs and other infrastructure, giving rise to questions on the industry's ability to respond to future drilling needs. Decreased spending on research and development raises concerns regarding future technological breakthroughs. Continued cutbacks and layoffs impair the industry's ability to attract new employees.

While these issues are significant, the Council wishes to emphasize that the industry has successfully met difficult challenges in the past and has proved to be resilient and resourceful. Each of the challenges identified in this study can be met if immediate, cooperative, and focused actions are taken by the industry and the government.

APPROACH TO THE 1999 STUDY

To conduct the study, the NPC Committee on Natural Gas appointed a Coordinating Subcommittee and three Task Groups to develop projections for gas demand, gas supply, and transmission and distribution. The primary focus of the study was to test supply and delivery systems against significantly increased demand. As in the case of the 1992 study, the Committee on Natural Gas selected Energy and Environmental Analysis, Inc. (EEA) to run econometric models for the analysis. The Coordinating Subcommittee and its Task Groups provided data and assumptions to EEA for inclusion in the development of a Reference Case for the focus period of 1999 to 2010. The assumptions used in the Reference Case represent a plausible view of the future and were selected with full understanding that, in reality, each could vary significantly. Each of the Task Groups developed sensitivity analyses to test the Reference Case through 2010 and to develop an extended view through 2015. The results of the Reference Case and the sensitivity analyses form a framework for better understanding the

factors that influence supply and demand balances. This approach was particularly useful in exploring the potential range of outcomes beyond 2010, a point at which uncertainties in assumptions begin to escalate. Throughout this report, data are reported for the focus period of 1999 to 2010, with an extended view for the more uncertain period of 2011 through 2015. While the study did not attempt to model supply and demand beyond 2015, the issue of long-term sustainability is addressed.

The study participants focused on the broader industry implications and dynamics indicated by the data rather than attempt to forecast specific end results. Issues such as new regulations for climate change were not examined in detail, but other factors that increase demand were specifically analyzed and some correlations can be made. Changes that are occurring in the areas of electricity generation, such as distributed generation, were not studied, but the overall impact of increases in gas demand due to electricity generation were examined.

The National Petroleum Council believes that the results of the study, which are contained in this report, are amply supported by the rigorous analyses conducted by the Committee on Natural Gas and its subgroups. Further, the Council wishes to emphasize that the significant growth in demand that is projected in this study is based on long-term trends and should not be interpreted as a “goal” of the industry. However, as natural gas demand continues to expand, the natural gas industry stands ready to work with all stakeholders to economically develop the natural gas resources and infrastructure necessary for continuing the nation’s economic growth and meeting its environmental goals.